

In the claims

Please amend the claims as follows:

1. (Currently amended) A method of manufacturing electrodes, the method comprising the steps of:
 - a) attaching a first electrode to a first reusable header; wherein said reusable header includes a shaped first end;
 - b) heating the first electrode to a temperature sufficient to melt said first electrode;
 - c) depositing the molten metal from the first electrode into a crucible;
 - d) solidifying the molten metal to form a second electrode, whereby where said second electrode has at least a portion complimentarily molded to be complementary shaped to the first end of the first second reusable header;
 - e) inverting the second electrode;
 - f) interlocking the shaped portion of the second electrode with the first end of the first reusable header; and
 - g) melting the second electrode to form an ingot of increased purity.

2. (Currently amended) ~~The method of manufacturing as set forth in claim 1, further comprising the steps of:~~ A method of manufacturing electrodes, the method comprising the steps of:
 - a) attaching a first electrode to a first reusable header;
 - b) heating the first electrode to a temperature sufficient to melt said first electrode;

- c) depositing the molten metal from the first electrode into a crucible;
- d) solidifying the molten metal to form a second electrode, whereby said second electrode has at least a portion complementary shaped to a second reusable header;
- e) attaching the second electrode with to the second reusable header;
- f) positioning the second electrode attached to the second reusable header in communication with a second crucible, the second crucible having at least a portion complementarily formed complementary shaped to a third reusable header;
- g) heating the second electrode to a temperature sufficient to melt said second electrode;
- h) depositing molten metal from the second electrode into said second crucible;
- i) solidifying the molten metal from the second electrode to form a third electrode.

3. (Currently amended) The method of manufacturing as set forth in claim 2, further comprising the steps of:
attaching the third electrode to the third reusable header and repeating the steps of positioning the a remelted electrode in communication with a crucible, heating the remelted electrode to a temperature sufficient to melt the same; depositing the molten metal into the crucible and solidifying the molten metal to form an additional electrode, until a final electrode of the desired metallurgical quality is produced.

4. (Original) The method of manufacturing as set forth in claim 2, wherein the

first and second reusable headers are of similar physical configuration.

5. (Original) The method of manufacturing as set forth in claim 3, wherein at least two of the first, second and third reusable headers are of similar physical configuration.
6. (Original) The method of manufacturing as set forth in claim 5, wherein all of the first, second and third reusable headers are of similar physical configuration.
7. (Currently amended) The method of manufacturing as set forth in claim 1, further comprising a step of:
placing a stub in the crucible prior to the step of heating the first electrode; the stub being positioned so that it forms the bottom surface of the crucible; and wherein the stub has an upper surface and a lower surface, the lower surface being having a shaped portion complimentarily complementary shaped to the shaped end of the second reusable header and including the one of a shaped projection and shaped recess; and wherein the stub is placed in the crucible so that the one of the shaped portion projection and recess faces downwardly away from the first electrode.
8. (Original) The method of manufacturing as set forth in claim 7, further comprising the steps of:
dripping the molten metal from the heated first electrode onto the upper surface of the stub;

melting at least a portion of the upper surface of the stub; and
integrally bonding the second electrode to the upper surface of the stub.

9. (Currently amended) The method of manufacturing as set forth in claim 1, wherein the step of attaching the first electrode to the first reusable header is accomplished by slidingly interlocking complimentarily a complementary shaped portion projection of one of the first electrode and first reusable header together with a recess of the other of the first electrode and first reusable header; and then clamping the first electrode and first reusable header together.
10. (Currently amended) The method of manufacturing as set forth in claim 9, wherein the step of attaching clamping the first electrode to the first reusable header ~~further~~ includes the step of threading fasteners against the shaped portion projection of the one of the first electrode and the first reusable header so that relative movement between the first electrode and first reusable header is substantially prevented.
11. (Currently amended) The method of manufacturing as set forth in claim 9, wherein the step of attaching the first electrode to the first reusable header includes the step of:

integraphy bonding the first electrode to a stub, wherein the stub has a lower surface that includes one of a projection and recess an area complimentarily complementary shaped to the shaped one of the projection and recess portion of

~~formed in~~ the first reusable header and subsequently interlocking the ~~complimentarily~~ shaped area of the stub and the first reusable header portion together.

12. (Original) The method of manufacturing as set forth in claim 11, wherein the stub is manufactured from the same material as the first electrode.

13. (Currently amended) The method of manufacturing as set forth in claim 11, further comprising the step of placing scrap metal pieces into a cold hearth furnace and then heating the pieces to a temperature sufficient to at least partially bond them together to form ~~a~~ the first electrode.

14. (Original) The method of manufacturing as set forth in claim 13, further comprises the step of welding the bonded scrap metal pieces to the stub.

15. (Currently amended) The method of manufacturing as set forth in claim 2, wherein the step of attaching the second electrode to the second reusable header is accomplished by interlocking ~~complimentarily~~ complementary shaped portions of the second electrode and second reusable header together.

16. (Currently amended) The method of manufacturing as set forth in claim 15, wherein the step of attaching the second electrode to the second reusable header includes the step of integrally bonding the second electrode to a second stub, wherein the second stub has a lower surface that includes one of a

projection and a recess ~~an area complementary~~ complementary shaped to the one of a projection and a recess formed in ~~shaped portion~~ of the second reusable header and subsequently interlocking the ~~complimentarily~~ complementary shaped area projection and recess of the second stub and the second reusable header ~~portion~~ together.

17. (Currently amended) The method of manufacturing as set forth in claim 16, wherein the step of attaching the second electrode to the second reusable header further includes the step of threading fasteners against one of the shaped area and the shaped portion of one of the second stub and the second reusable header, so that relative movement between the second stub and second reusable header is substantially prevented.
18. (Currently amended) A method of manufacturing ~~electrodes ingots~~, the method comprising the steps of:
 - a) providing a first electrode with one of a projection and a recess formed in an upper end thereof;
 - b) providing a first reusable header with the other of a projection and a recess formed in a lower end thereof; wherein at least a section of the first reusable header is manufactured from substantially the same metal as the first electrode;
 - c) a) attaching engaging the upper end of the a first electrode to a with the lower end of the first reusable header, wherein at least a section of the first reusable header is manufactured from substantially the same metal as the first electrode;

- d) clamping the first electrode and first reusable header together;
- e) b) heating a lower end of the first electrode to a temperature sufficient to progressively melt said first electrode;
- f) e) depositing the molten metal from the first electrode into a crucible;
- g) d) solidifying the molten metal to form a second electrode an ingot.

19. ~~The method of manufacturing as set forth in claim 18, further comprising the steps of:~~ A method of manufacturing electrodes comprising the steps of:

- a) attaching a first electrode to a first reusable header, wherein at least a section of the first reusable header is manufactured from substantially the same metal as the first electrode;
- b) heating the first electrode to a temperature sufficient to melt said first electrode;
- c) depositing the molten metal from the first electrode into a crucible;
- d) solidifying the molten metal to form a second electrode;
- e) attaching the second electrode with to the second reusable header, wherein at least a section of the second reusable header is manufactured from substantially the same metal as the second electrode;
- f) positioning the attached second electrode and attached to the second reusable header in communication with a second crucible;
- g) heating the second electrode to a temperature sufficient to melt said second electrode;
- h) depositing molten metal from the second electrode into said second crucible;
- i) solidifying the molten metal from the second electrode to form a third electrode.

20. (Currently amended) The method of manufacturing as set forth in claim 19, further comprising the steps of:
attaching the third electrode to ~~the a~~third reusable header, wherein at least a section of the third reusable header is manufactured from substantially the same metal as the third electrode; and subsequently repeating the steps of positioning ~~the a~~remelted electrode in communication with a crucible, heating the remelted electrode to a temperature sufficient to melt the same; depositing the molten metal into the crucible and solidifying the molten metal to form an additional electrode, until a final electrode of the desired metallurgical quality is produced.

21. (Currently amended) The method of manufacturing as set forth in claim 1819, wherein the step of attaching the first electrode to the first header further comprises the step of:
interlocking complimentary shaped portions on the first electrode and first reusable header together.

22. (Currently amended) The method of manufacturing as set forth in claim 18 20, wherein said section of the first reusable header is a detachable stub and said step of attaching the first electrode to the first reusable header further comprises the step of:
integrally bonding the first electrode to the stub.

23. (Currently amended) The method of manufacturing as set forth in claim 22, further comprising the step of placing scrap metal pieces into a cold hearth furnace and then heating the pieces to a temperature sufficient to at least partially bond them together to form ~~a~~ the first electrode.

24. (Original) The method of manufacturing as set forth in claim 23, further comprises the step of welding the bonded scrap metal pieces to the stub.

25. (Currently amended) The method of manufacturing as set forth in claim 22, wherein the step of attaching the first electrode to the first reusable header is accomplished by interlocking ~~complimentarily~~ complementary shaped portions of the stub and first reusable header together.

26. (Original) The method of manufacturing as set forth in claim 25, wherein the first and second reusable headers are of similar physical configuration.

27. (Original) The method of manufacturing as set forth in claim 26, wherein at least two of the first, second and third reusable headers are of similar physical configuration.

28. (Original) The method of manufacturing as set forth in claim 27, wherein all of the first, second and third reusable headers are of similar physical configuration.

29. (Original) The method of manufacturing as set forth in claim 19; wherein said section of the second reusable header is a detachable second stub and said step of attaching the second electrode to the second reusable header further comprises the steps of:

 placing the second stub in the crucible prior to step of heating the first electrode;

 dripping the molten metal from the heated first electrode onto the upper surface of the second stub;

 melting at least a portion of the upper surface of the second stub; and
 integrally bonding the second electrode to the upper surface of the second stub.

30. (Currently amended) The method of manufacturing as set forth in claim 29, wherein the step of attaching the second electrode to the second reusable header is accomplished by interlocking ~~complimentarily~~ complementary shaped portions of the second stub and second reusable header together.

31. (Original) The method of manufacturing as set forth in claim 30, wherein the step of attaching the second electrode to the second reusable header further includes the step of threading fasteners against the shaped portion of one of the second stub and the second reusable header so that relative movement between the second stub and second reusable header is substantially prevented.

32. (Canceled)

33. (Canceled)

34. (Canceled)

35. (Currently amended) The reusable header as set forth in claim 34; A reusable header for supporting an electrode for melting in a furnace, the reusable header comprising:

a base having a first end and a second end;

a shaft extending from the first end of the base, the shaft being adapted to connect the header to a ram for reciprocal movement within the furnace;

an attachment adapted to releasably secure the electrode to the second end of the base; wherein the attachment comprises

a shaped recess and a shaped projection being complementary shaped to interlock with each other, wherein one of the shaped recess and projection is formed in the second end of the base and the other of the shaped recess and projection is formed on the electrode; and wherein the recess has first walls and the projection has second walls and the header further includes at least one clamp that forces the second walls of the projection into engagement with the first walls of the recess.

36. (Original) The reusable header as set forth in claim 35, wherein the clamp is at least one screw.

37. (Original) The reusable header as set forth in claim 36, wherein the screw enters the first end of the base, extends through the base and terminates adjacent the shaped end of the electrode at the second end of the base.

38. (Currently amended) The reusable header as set forth in claim 32 35, wherein at least a section of the header is manufactured from a metal that is substantially the same as the electrode which it is adapted to support.

39. (Original) The reusable header as set forth in claim 38, wherein said section is a detachable stub, said stub having an upper surface and a lower surface; the stub being releasably connectable to the header.

40. (Currently amended) The reusable header as set forth in claim 39, wherein the lower surface of the stub has ~~an area complimentarily~~ includes one of a projection and a recess complementary shaped to one of the projection and recess formed in the shaped portion of the header and the shaped area one of the projection and recess of the stub interlocks with the shaped portion one of the projection and recess of the header.

41. (Original) The reusable header as set forth in claim 40, wherein the electrode is integrally bonded with the upper surface of the stub;

42. (Currently amended) The reusable header as set forth in claim 41, wherein the

complementary recess and projection formed in the stub and header are of a dovetail shape.

43. (Original) The reusable header as set forth in claim 42, wherein the recess has first walls and the projection has second walls and the header further includes at least one clamp that forces the second walls of the projection into engagement with the first walls of the recess.
44. (Original) The reusable header as set forth in claim 43, wherein the clamp is at least one screw.
45. (New) The method of manufacturing electrodes as defined in claim 1, wherein the first end of the first reusable header includes one of a projection and a recess and the shaped portion of the second electrode includes the other of a projection and a recess; and wherein the method further includes the step of sliding the second electrode laterally relative to the first reusable header to engage the projection in the recess.
46. (New) The method of manufacturing electrodes as defined in claim 1, wherein the first reusable header further includes a clamping mechanism; and wherein the method of manufacture further includes the step of engaging the clamping mechanism to lock the second electrode to the first reusable header.

47. (New) The method of manufacturing electrodes as defined in claim 46, wherein the first end of the first reusable header includes the recess therein and the shaped portion of the second electrode includes the projection; and the method of manufacturing includes the step of screwing a plurality of screws into the recess to engage the projection and thereby lock the second electrode to the first reusable header.

48. (New) The method of manufacturing electrodes as defined in claim 1, wherein the method further includes the step of attaching the first reusable header to a vertically movable ram.

49. (New) The method of manufacturing ingots as defined in claim 18, wherein the projection and recess are dovetail in shape and the projection formed on one of the first electrode and reusable header is slidingly engaged into the recess formed in the other of the first electrode and reusable header.

50. (New) The method of manufacturing ingots as defined in claim 49, further including the step of screwing a plurality of screws outwardly from the first end of the first reusable header to urge an upper end of the second electrode away from the first end of the first reusable header and to thereby prevent said projection from sliding out of said recess.